

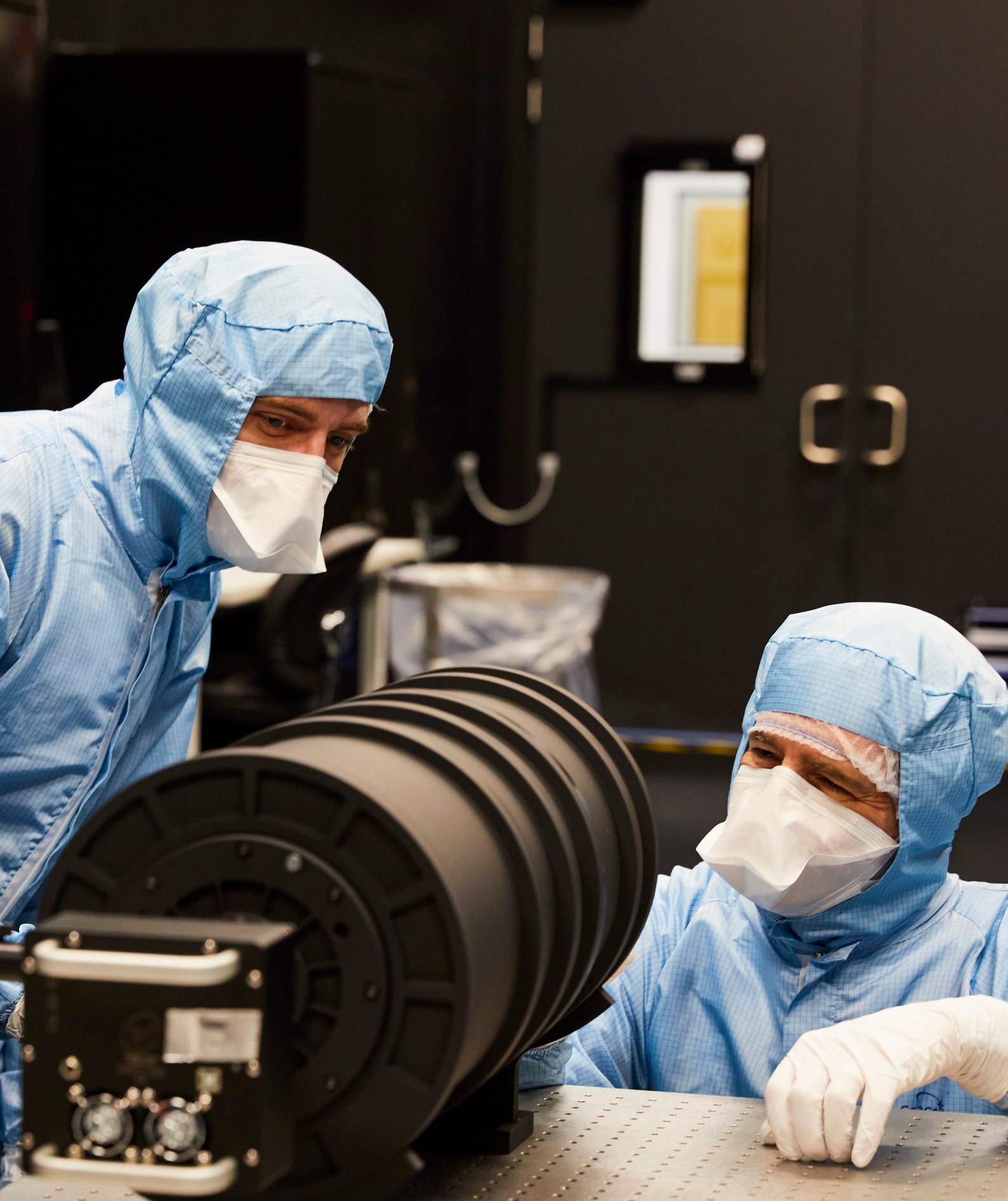


Science and
Technology
Facilities Council

RAL Space

RAL Space Strategy 2023–2028





Front cover: R100 building, RAL Space. Credit: STFC RAL Space
Inside cover: Engineers with the COR Stray-light Qualification Model (CSQM) - a novel compact coronagraph concept for operational space weather monitoring. Credit: STFC RAL Space
Back cover: A laser distribution setup in one of RAL Space's cold atom labs. Credit: STFC RAL Space

Foreword



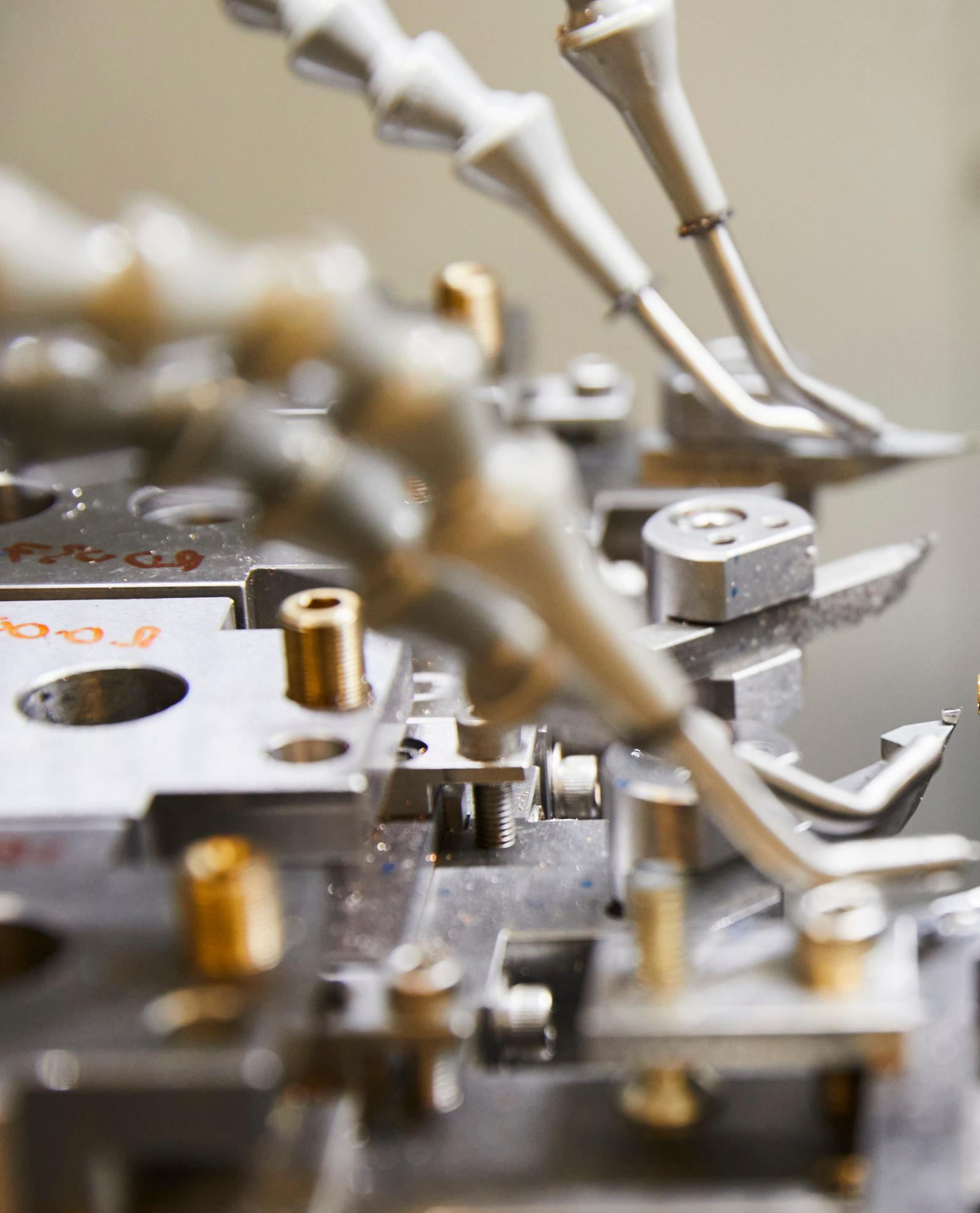
As humanity continues to push the boundaries of space exploration, RAL Space remains a cornerstone of scientific innovation, driving us forward in our quest to understand the mysteries of the Universe. With our rich history of ground-breaking contributions to space exploration, RAL Space continues to play a vital role in advancing our understanding of the Universe, our planet, and its environment.

RAL Space is the UK's National Space Laboratory serving the space community, including academia,

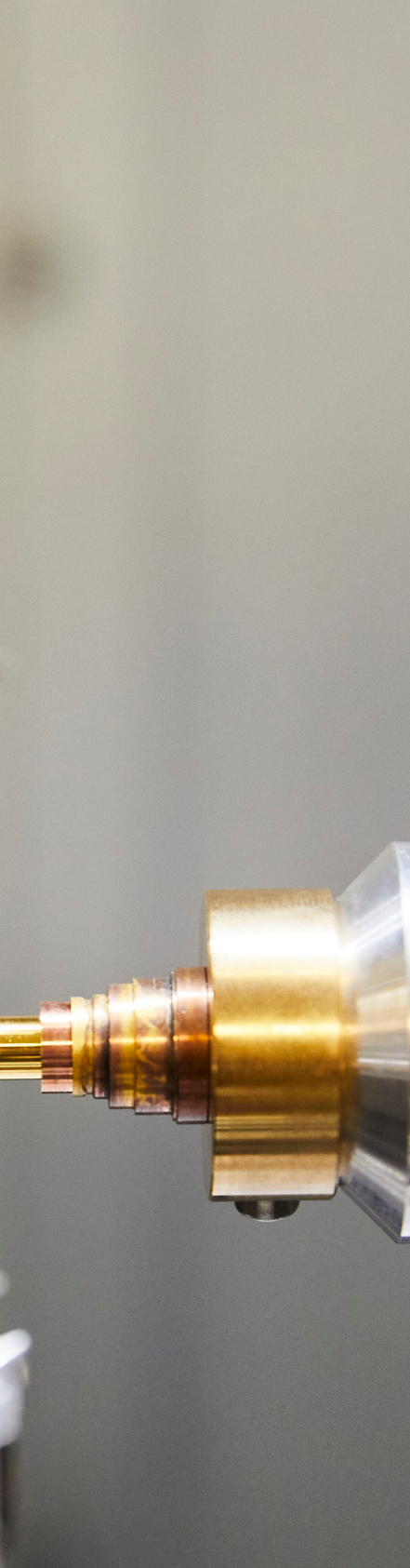
industry, Government and the general public. As an integral part of the Science and Technology Facilities Council (STFC) and UK Research and Innovation (UKRI), RAL Space provides a collaborative, inspirational, high quality and neutral focal point for science-driven, technology-enabled, space research and innovation.

The space landscape is changing more quickly and profoundly than ever before. RAL Space will be at the forefront of this change: driving and developing new technologies and science; adapting to the exciting new challenges and priorities of the UK and international space community, whilst maintaining and growing our existing world-class strengths and expertise. Our new strategy reflects our ambitious plans to deliver against these goals over the next five years, requiring us to be agile and flexible in our approach and putting our people at the heart of what we do. I am delighted to share our strategy with you and look forward to us working together to achieve our aims.

**Dr Sarah Beardsley,
Director STFC RAL Space**



Ultra-precision diamond machining of gold plated targetry for the Central Laser Facility. Credit: STFC RAL Space



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Our vision

This strategy highlights how we will grow to become a more diverse and connected organisation of international standing, adapting and continuously improving our ability to deliver **our vision**:

As the UK's national space laboratory, we make our world a better place by partnering with our community to advance knowledge and the use of space and the environment to benefit all

Our mission: is to create and use our knowledge and expertise of space and the terrestrial environment to solve future societal issues, drive economic growth and strengthen our understanding of our place in the Universe. We will inspire the world by unlocking the secrets of the Universe, create a better understanding of the Earth and its environment and protect it from the threats of space weather and space debris.

We will do this by ensuring the UK leads the world in space-enabled science, data and enabling technologies to develop, deliver and support cutting-edge scientific missions through:

- Supporting community access to advanced instruments and facilities, rich data archives, services and expertise
- Nurturing creative talent, inspiring scientific, technical and engineering research excellence
- Providing exceptional underpinning capabilities that enable advanced solutions and scientific creativity with real-world quantifiable impact.

Our themes

Our themes are centred on our three key scientific focus areas which are underpinned by our ability to provide world leading research, technology and innovation, data services, facilities and engineering capability, which in turn are enabled by our people, our community relationships and operational excellence. These will drive our need for funding, planning, resources and skills to adapt our organisation to create the best model to deliver this. The themes are summarised as:



Science Drivers



Resilient society

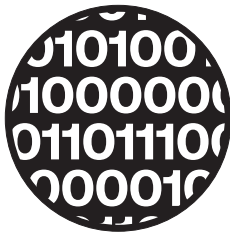


Earth observation

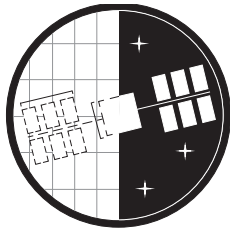


Space science
and exploration

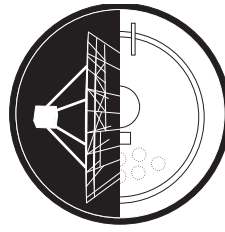
Value Proposition



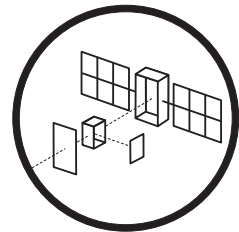
Data services



Research,
technology and
innovation



Facilities

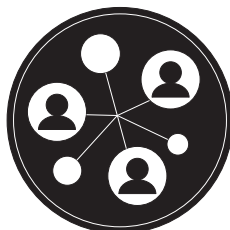


Engineering
capability

Enablers



People,
communication
and skills



Community



Operational
excellence



Resilient society

STFC Strategy link: Ideas, Impact

UKSA link: Sustainability, LEO capabilities

NSS goal: Protect and defend our national interests in and through space

Aspiration: Our Resilient Society theme brings together outputs from our Space Science and Earth Observation (EO) activities, so that hazards from space weather and space debris can be understood and mitigated and that the data from our Earth Observing instruments are used in the optimum way to address the challenges of an ever-changing world. Through our engagement with European Space Agency (ESA) and UK Space Agency (UKSA), as well as our links within UK Research and Innovation (UKRI) and across government, we will play a key role, linking our own capabilities with those of the wider UK and international research community to address the evolving requirements of monitoring agencies and risk-holders. With our stakeholders, we will deliver research programmes, facilities and missions, contributing to the maintenance of a sustainable space and global environment system.

Context: Modern society is underpinned by the use of satellites and space technologies in areas ranging from communications through position, navigation and timing to imaging and remote sensing. The scope of these activities will continue to grow rapidly, but this raises the huge challenge of keeping near-Earth space sustainable and available for use, protecting our ground-based infrastructure and creating a resilient society. Doing this requires the understanding of natural hazards such as space weather and ensuring that orbiting objects are tracked to avoid collisions and limit the potential impact of space debris. These will be essential activities as near-Earth space increasingly becomes a more managed and regulated environment.

Our Impact: Through our collaborations with ESA, UKSA, the UK Met Office and the wider research community, we are bolstering the range of monitoring and modelling services available in the UK and internationally, to understand and predict the behaviour of the space environment. We are the scientific lead for the Heliospheric Imager for the ESA Vigil mission, which will make key observations of the Earth-directed solar wind from the L5 Lagrange point. We are leading the cross-council SWIMMR space weather programme, which will deliver multiple modelling and monitoring capabilities from the research community into operations at the Met Office. We also operate radar and optical systems which contribute to the monitoring and tracking of UK spacecraft in Low Earth Orbit and will thus contribute to the development of a future “space traffic management” system.

Between 2023 and 2028 we will:

- Complete the delivery of products and services from our Space Weather Instrumentation, Measurement, Modelling and Risk (SWIMMR) programme and look for opportunities for a follow-on programme more geared toward supporting these new operational capabilities
- Continue to develop the Heliospheric Imager for Vigil toward launch in 2029/30
- Establish a new National Centre for Space Situational Awareness at Chilbolton, enhancing the capabilities of our 25 m radar antenna for the monitoring and tracking of civil space objects to build the understanding of the influence of space weather on orbital dynamics
- Deliver against the Space Domain Awareness pillars of the National Space Strategy (NSS)



Earth observation

STFC Strategy link: Ideas, Innovation

UKSA link: Earth observation, Innovation

NSS goal: Use space to deliver for UK citizens and the world

Aspiration: To prioritise full lifecycle from innovation of low-Technology Readiness Level (TRL <4) and low-Societal Readiness Level (SRL) developments, driving mission concepts from science motivators through to instrument design, calibration and testing, and finally to data exploitation and utilisation post-launch as an integrated part of the national and international community. We will provide leadership in motivation and investment planning, calling on experience and perspective of whole mission lifecycles. We will meet the demands from the environmental science community and beyond.

Context: Building on decades of expertise in EO and atmospheric science, we are a world-class and trusted partner dedicated to advancing the knowledge and monitoring of the Earth's systems, focussing on ingenious research and innovation, instrument build and deployment and exploitation of data sets to solve environmental and societal challenges.

Our Impact: Our programme identifies the big scientific EO questions, leading and reflecting the national and international community priorities, resolving complex questions to ensure positive impact and improved quality of life. Our expertise in EO and atmospheric science, spans the full range of applications, as well as ground-based in-situ capabilities, e.g. Chilbolton Observatory. We run internationally significant data services supporting data curation, dissemination, processing and analysis with the Centre for Environmental Data Analysis (CEDA) Data Archive and JASMIN computing facility.

Between 2023 and 2028 we will:

- Deliver the CubeMAP mission up to in-orbit commissioning, exploiting and improving scientific data with the user community
- Work in partnership with National Centre for Atmospheric Science (NCAS) to develop Chilbolton's role within the Atmospheric Measurement and Observation Facility (AMOF) as the UK hub for atmospheric research radar, extending our record of long-term quality-controlled atmospheric observations for the benefit of the research community and UK society
- Establish Chilbolton as a cloud and aerosol remote sensing national facility within the pan-European Aerosol, Clouds and Trace Gases Research Infrastructure (ACTRIS)
- Strengthen our partnerships in Carbon Capture and Sequestration (CCS) monitoring systems
- Develop novel gas emission monitoring systems (hardware and software), and scientifically support new sensors, platforms and data
- Develop the application of millimetre wave components developed for Earth observation to diagnostic equipment for fusion plasma
- Provide packaged monolithic microwave integrated circuit (MMIC) transistor technology for cryogenic radio astronomy receivers and active room temperature calibration sources for radiometers
- Advance the high accuracy/precision Advanced Surface Temperature Radiometer Network to measure surface temperatures to validate satellite datasets
- Create new datasets on atmospheric composition with advanced capabilities from next generation missions in polar orbit and geo constellations



Space science and exploration

STFC Strategy link: Ideas, Impacts

UKSA link: Discovery, Inspiration, Innovation

NSS goal: Lead pioneering scientific discovery and inspire the nation

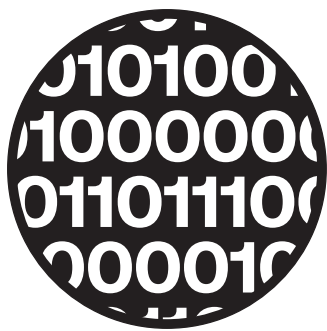
Aspiration: To be a world-class centre of excellence in space science and exploration research and projects, spearheading and supporting the wider UK research community. We aim to protect a strong scientific research team across our key disciplines, retain in-house critical technologies and capabilities, and develop new generations of space-based and ground-based instrumentation. All of this will build upon our established heritage in international missions and facilities.

Context: The desire to understand and explore the universe is one of humanity's most fundamental drivers. Whether exploration of our solar system, understanding the processes which power our Sun, exploring the formation and evolution of stars and galaxies, solving the biggest questions in cosmology as to how the universe formed and evolved, or seeking Earth-like planets and life elsewhere in the galaxy, space science will remain a central activity for every developed nation and the UK is fortunate to lead in many areas. We will use our technology and skills to develop scientific experiments to be conducted by astronauts either on the lunar gateway or on the lunar surface.

Our impact: We have a very long heritage in the leadership, conception and proposal of missions and ground-based projects with the major space agencies of the world and have led the development and operation of numerous instruments and payloads for several decades. We have developed scientific instruments that have operated on or around the Moon, landed on a comet, orbited Saturn and landed on Titan and have been key to completing the commissioning of the Mid-Infrared Instrument (MIRI) instrument on the James Webb Space Telescope (JWST) and supporting its operation, and in developing the forthcoming ESA Ariel mission to characterise exoplanet atmospheres. We enable scientists in the UK and around the world to understand the conditions and history of the objects in our solar system, and to understand the needs for future potential human visits to these environments.

Between 2023 and 2028 we will:

- Exploit the data from Solar Orbiter throughout the period of its closest perihelion approaches to the Sun (lasting until 2027)
- Support the delivery of Ariel - the major upcoming ESA mission to study the formation and evolution of exoplanets and planetary systems
- Deliver the detector systems and post-launch calibration, for four visible-light cameras on the NASA Polarimeter to Unify the Corona and Heliosphere (PUNCH) mission to understand how the solar corona evolves
- Scale up our work on the Square Kilometre Array (SKA) Science Data Pipeline as the world's largest radio telescope by the late 2020s
- Secure leading roles in instrumentation in at least one of the future ESA's 'Cosmic Vision' and 'Voyage 2050' programmes
- Deliver scientific analytical instrumentation to the surfaces of both the Moon and Mars
- Complete the development and deliver subsystems for two instruments on ESA's ExoMars rover, Rosalind Franklin (launch 2028)
- Deliver ENFYs, a new UK-led proposal to replace the Russian Infrared Spectrometer (ISEM). ENFYs is essential in providing complementary science to the UK-led PanCam, the Rosalind Franklin rover's scientific eyes
- Secure the science lead role in Vigil to enable improved forecasts of the arrival of space weather phenomena at Earth, through real-time monitoring of the Sun and solar wind



Data services

STFC Strategy link: Ideas, Impacts

UKSA link: Earth observation, Innovation

NSS goal: Use space to deliver for UK citizens and the world

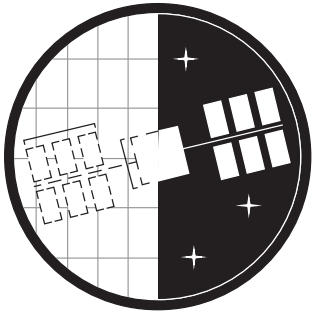
Aspiration: An ever-greater integration between different data sources and the integration of data and computational resources. We want to provide a stimulus for the application of Artificial Intelligence (AI) technologies and facilitate the development of digital twins. We will continue to innovate in the application of technologies for storage and processing in response to the expected increases in data capacity driven by exascale computing and new generations of instrument for data acquisition. We will build on and expand the model of platform-based computing pioneered by JASMIN.

Context: Data is fundamental to scientific discovery and the ability to gain new insights about the natural world and consequential impact and benefit to society. Across the department we work with a diverse array of different data sources from space-borne instruments supporting space science and EO missions, to ground-based observatories or super computers running codes to generate simulations for future climate prediction. Alongside our essential data management function, the provision of computing services using the JASMIN infrastructure provides a platform from which users can readily access data and resources for processing and analysis in a single unified environment.

Our impact: We contribute and provide leadership in high profile international collaborations including the Earth System Grid Federation, host to the Coupled Model Intercomparison Project (CMIP) multi-model data archive (underpins Intergovernmental Panel on Climate Change (IPCC) global assessments) and host to ESA's Climate Change Initiative Open Data Portal for Essential Climate Variables. Alongside this, JASMIN continues to be a highly successful and innovative computing platform which has been influential in the EO and climate and atmospheric science communities and a model which has been emulated in other science domains. CEDA archive services, hosted on JASMIN, provide over 150,000 registered users with access to the CEDA archive of 20PB data.

Between 2023 and 2028 we will:

- Work with our partners amongst the Natural Environment Research Council (NERC) data centres to contribute towards the development of a harmonised archive of trusted data sources through the implementation of the vision for the NERC Environmental Data Service
- Form collaborations with industry and the public sector towards common infrastructure for the exploitation of EO and environmental datasets
- Continue to build on the capabilities of JASMIN as a platform to enable the provision of services for data-intensive computation and analysis and implement the vision of JASMINx for its use in new domain areas
- Actively pursue a training programme to integrate the model of collocated data and computing (JASMIN + CEDA Archive) to equip new generations of researchers with data science and software engineering skills to effectively exploit data
- Strengthen our collaboration work and leadership in international data infrastructures, e.g., Earth System Grid Federation, European Network for Earth System Modelling
- Gradually scale up our work on the SKA Science Data Pipeline as the world's largest radio telescope by the late 2020s



Research, technology and innovation

STFC Strategy link: Innovation, Impacts

UKSA link: Innovation, Discovery, Earth Observation, Levelling-up, Inspiration

NSS goal: Lead pioneering scientific discovery and inspire the nation

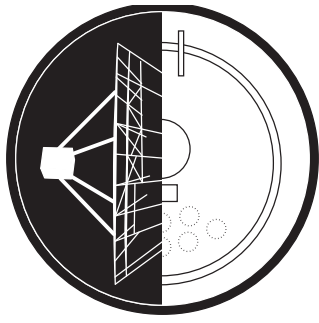
Aspiration: To be the partner of choice, for both academics and industry, in the development of disruptive space technology solutions with a mix of public and private investment in our programmes. We will have demonstrable evidence of our engineering excellence and the UK wide benefits of the novel and innovative technologies and services that we have pioneered.

Context: Cutting edge technologies are hard and expensive to space qualify, so rewards and risks must be balanced, with clear achievable objectives. Science has often been the primary mover and investor in such technologies and has underpinned many development roadmaps with industry and government. These have led to very broad outcomes: sovereign capabilities, international collaborations, exports and inward investment. Our efforts will underpin research and development to enable our strategic themes, through support of our current and future IM researchers.

Our impact: We work with both technology inventors (push) and users (pull) to identify innovative solutions to pressing questions. We help build the case for development by identifying the potential impacts, the wider user base and the supply chains involved. We integrate systems, providing support and direction to original developers, and speed their adoption by enabling testing and demonstration of unique capabilities. We provide designs of instruments and services for commercial and societal benefit.

Between 2023 and 2028 we will:

- Gather information on new technologies that can address concept missions in preparation and justify UK involvement in the science user collaboration, mission development team and supply chain
- Identify users and inventors for the development of new space detector technologies and instigate at least one roadmap programme
- Develop an early space use case for Quantum Technology (magnetometry, 1D accelerometry, calibration sources) and continue to develop long term case and key enabling technologies for Cold Atom Interferometry
- Improve Schottky diode technology for frequency multiplication and conversion, as well as calibration
- Progress our technology for solid state and vacuum tube amplifiers for communications to satellites and remote sensing instruments such as AMAPS BARODAR
- Build a commercial partnership to enable the spin out of an instrument or service and use it to prime a pipeline for future service delivery through innovative technology
- Review the current underpinning technologies (electronics, thermal management, mechanisms) and commence roadmaps for developments and exploitation
- Increase direct collaboration and joint working with both academia and industry by embedding their staff in our teams and by providing sabbatical/fellowship opportunities



Facilities

STFC Strategy link: Innovation, Impacts

UKSA link: Launch, Innovation, Discovery, Sustainability

NSS goal: Grow and level up our space economy

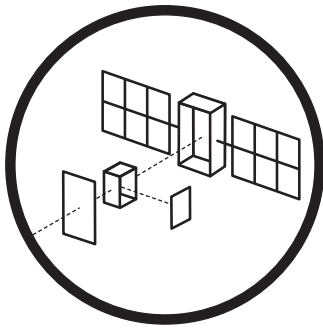
Aspiration: RAL Space will continue to be the UK's leading organisation for space related environmental test facilities. We will work with UKSA to engage the community need and provide suitable test facilities accessible to all within a financially sustainable model. We have ambition to be the UK technical hub operating at the highest quality standards, engaging, influencing and developing test methods and standards. As experts in testing, we have ambition to offer technical and quality assurance advice to others to support their ambitions. We will ensure that the JASMIN expansion keeps pace with demand from the environmental science community and beyond. Chilbolton will be developed to be a central pillar of capability in the UK.

Context: Facilities are critical to the construction and operation of space assets, from facilities to test space hardware to data curation facilities allowing access to long term datasets. By their very nature facilities are expensive to run and may only be used periodically by projects or organisations. By hosting in a neutral organisation we give access to a wide range and scale of facilities for the benefit of the entire space community. RAL Space operates many facilities, including ground-based observatories, long-term datasets and digital platforms, plus technical capability in manufacture, test and calibration, and cleanrooms that underpin the commercial success and growth of the community. Critical to the operation of all facilities are the three pillars of: people, processes, and equipment, and RAL space aims to operate all our facilities with excellence in all these pillars.

Our impact: Access to complex facilities is an essential part of technical and scientific development and will continue to be critical to almost every part of space activity. From test facilities of the scale of the National Satellite Test Facility (NSTF) allowing the UK to build and test seven ton satellites through to JASMIN enabling the environmental science community to store, process and share their data, facilitating progress with their research. Operating the facilities on a commercial basis allows academic and commercial organisations access to high quality facilities, people and processes in a cost-effective manner. Having these facilities located in the UK significantly reduces costs within UK-based development programmes, supporting the UK's ambition to grow the space sector across all areas.

Between 2023 and 2028 we will:

- Be operating NSTF for users by 2024 and run NSTF in steady state operation, in a financially sustainable manner, and have a future development roadmap created based on community need by 2028
- Be certified to EN9100 and ECSS-Q-ST-20-07C for the medium (2023) and large-scale test facilities (2024) in support of our continued quality assurance
- Develop the Small Satellite Calibration Facility to provide an agile service supporting those developing small satellite missions
- Extend JASMIN services to additional science communities that can benefit from access to environmental data by 2025
- Upgrade the Precision Development Facility with state-of-the-art automated precision CNC milling, die sinking and turning machines
- Establish a new National Centre for Space Situational Awareness at Chilbolton



Engineering capability

STFC Strategy link: Innovation, Impacts

UKSA link: Discovery, Innovation, Inspiration

NSS goal: Lead pioneering scientific discovery and inspire the nation

Aspiration: Deliver the highest quality engineered solutions to address complex problems for RAL Space and its customers. Take responsibility for engineering leadership in RAL Space and provide a pipeline of suitably skilled people to support RAL Space in the long term to enable its vision.

Context: The engineering of scientific instruments for operation in space, and on the ground, is a crucial capability for RAL Space to realise its ambitions of carrying out world class research. Having teams of experienced and competent engineers and technicians who understand how to design and build hardware that can withstand the challenging environment of space, whilst meeting very demanding scientific requirements, makes the task of developing new instruments more achievable.

Alongside the development of hardware, software engineering crosscuts activities, from embedded systems integrating with flight hardware to the development of applications for the ground-based processing of data stream at scale from EO and space science missions and ground-based observatories.

Our impact: Our engineering capabilities enables our scientists to produce high quality data products for use by themselves and other research communities throughout the UK and the rest of the world. When used in collaboration with national and international institutes, it enables us to play an important role in highly complex missions run by large space agencies such as ESA and NASA. The technology developed by us has helped reduce the cost and time to develop new instruments and has found applications in many non-space areas. We have recruited and trained many graduate engineers and technicians, many of whom have moved on to successful careers with emerging aerospace companies located in the UK.

Between 2023 and 2028 we will:

- Focus on instrumentation and deepen our knowledge and understanding of the technologies needed to provide world class instruments for the next generation missions
- Support our scientists to develop new mission ideas, and scientific instruments in support of those missions, by participating in studies and pre-development activities
- Be a lead engineering partner in international collaborations for future large scale space missions
- Continue to support the environmental test facilities and the instrument calibration facility and provide engineering support to ground based systems where RAL Space has a significant interest and involvement
- Develop and support our staff to enable them to reach their desired potential and
- Ensure our teams buy into project delivery, and feel part of a delivery team



Community

STFC Strategy link: Impacts

UKSA link: Earth Observation, Discovery, Inspiration

NSS goal: lead pioneering scientific discovery and inspire the nation

Aspiration: RAL Space will be the heart of the UK and global space sector, the partner of choice for academia and industry and a space organisation that inspires, influences and encourages collaboration and cross-disciplinary partnerships throughout UKRI and the wider space sector. We will leverage our position in the Harwell Space Cluster and bring together the expertise and resources of our strategic partners to tackle the most pressing scientific challenges and achieve breakthrough discoveries that have the potential to transform our understanding of the Universe.

Context: Excellent leadership is essential to the UK space community. The space sector in the UK is evolving rapidly and is a complex landscape. Drawing upon our rich heritage of more than 60 years as a key player in the space industry, we are in a unique position of trust within the community and one that we can develop and exploit further. We are at the gravitational centre of the Harwell Space Cluster which continues to grow and forms an integral part of the UK's space sector.

Our impact: Fundamental to the way we work, is to collaborate. Our scientists maintain national and international scientific research collaborations that often spearhead the drivers for future projects and missions. We work closely with academia and industry to develop technology, research solutions and test their inventions. Our stakeholders also include policy makers, and we deliver against the National Space Strategy and the National Defence Strategy. We will continue nurturing and developing these collaborations with the wider scientific community to ensure that we are well placed for driving scientific advances and for future project acquisition.

Between 2023 and 2028:

- Strengthen our relationships with key space partners to enable us to work collaboratively to deliver on the National Space Strategy
- Scale up work with international partners (through new UKSA bilaterals programs) and identify missions where our technologies and expertise can be exploited
- Work with UKSA, UK Space Command, commercial and academic partners to ensure that the sustainable utilisation of space is fully integrated into development strategies, including minimising impacts on fundamental science from commercial exploitation
- Drive new relationships and nurture existing ones to shape future agendas in strategic committees and collaborations
- Extend our collaborations with STFC National Laboratories partners to maximise the benefit of our endeavours for all
- Work across UKRI to better coordinate activities and partnerships with other research councils and their institutes



People, communication and skills

STFC Strategy link: People and Careers; World-class organisation

UKSA link: Inspiration, Relationships

NSS link: Upskills and inspire our future workforce

Aspiration: We will be a multidisciplinary organisation that puts its people first. Challenge and support will be the norm, striving for the goal whereby everyone can aspire to achieve their full potential. We will create a pipeline of talent, strengthening our skills base from apprentices to researchers. Our public and school engagement will inspire the next generation and develop greater numbers of early career scientists, engineers, and technologists. We will lead the way for bringing diverse groups into science, technology, engineering, and mathematics (STEM) and retaining these people to create a diversity of staff that reflects the background population in the UK (2021 = 51% female, 18% BAME) – recognising that this can only be achieved by having the right culture of inclusion and acceptance.

Context: People are the beating heart of RAL Space, and our success is built upon their passion, dedication and desire to create a better world. To retain our position as a world-leading organisation, we need to have a team that is diverse, highly skilled, and competent with the abilities to deliver the scientific and technical ambitions of the UK space sector. Our researcher cohort is recognised as a key group with the credentials to interact with the international community and to spearhead the conception and proposal of future projects. By enabling our people and the future generation to be the best they can, by developing their talents and embedding a culture of collaboration and inclusion, we nurture our researcher staff through recognition of the Researcher Concordat and its application within UKRI.

Creating a pipeline of talent is central to our strategy, working with the youngest children to encourage engagement in STEM (and specifically to promote STEM to less represented people in society), encouraging school-leavers to join our apprenticeships, graduate and industrial placement schemes, whilst creating an inclusive workplace that entices already skilled people to join us later in their career by being an employer of choice.

Our impact: Our staff deliver our programme, support our community, collaborate internationally, engage at all levels and inspire all; their impact cannot be understated. By investing more in our staff, our output will multiply, creating further economic and societal benefit to the UK.

Between 2023 and 2028 we will:

- Put Continuing Professional Development at the heart for all members of RAL Space, and support both the Technician Commitment and Skills Factory in STFC
- Support our most experienced staff to become the very best coaches and mentors for the next generation of specialists
- Inspire the public and school students through our outreach programme, championing space as accessible for all and prioritising activities that target under-represented groups
- Make RAL Space a destination of choice for recent graduates
- Develop new and nurture existing partnerships and collaborations to deliver an inspirational engagement programme
- Be recognised as spearheading the drive for equality, diversity and inclusion in the workplace



Operational excellence

STFC Strategy link: World Class Organisation

UKSA link: Relationships

NSS link: Grow and level up our space economy

Aspiration: Our aspiration is to build an organisational structure which is optimised for portfolio delivery by a team of 350+ staff. This will enable delivery of a sustainable mix of project types that utilises our staff cohort to best effect and allow us to generate a return on external income each year to invest in our facilities and contribute to STFC.

We want to be a recognised centre of excellence and credible contenders for the British Quality Foundation awards through our continuous improvement processes, with the aspiration to have continuous improvement as part of every individual's day-to-day mindset.

Context: We operate in a complex environment, taking on risky and challenging projects across a broad range of areas for customers and users with high expectations of what we will deliver. We are certified to ISO 9001 for our work developing instruments, with test facilities now certified to the more demanding aerospace EN 9100 standard and, from 2023, the ESA ECSS-Q-ST-20-07C standard. We run multiple continuous improvement initiatives ranging more widely across the activities of the department, recognising the importance of the voice of the customer, the voice of the business and the voice of the team to guide the activities we prioritise.

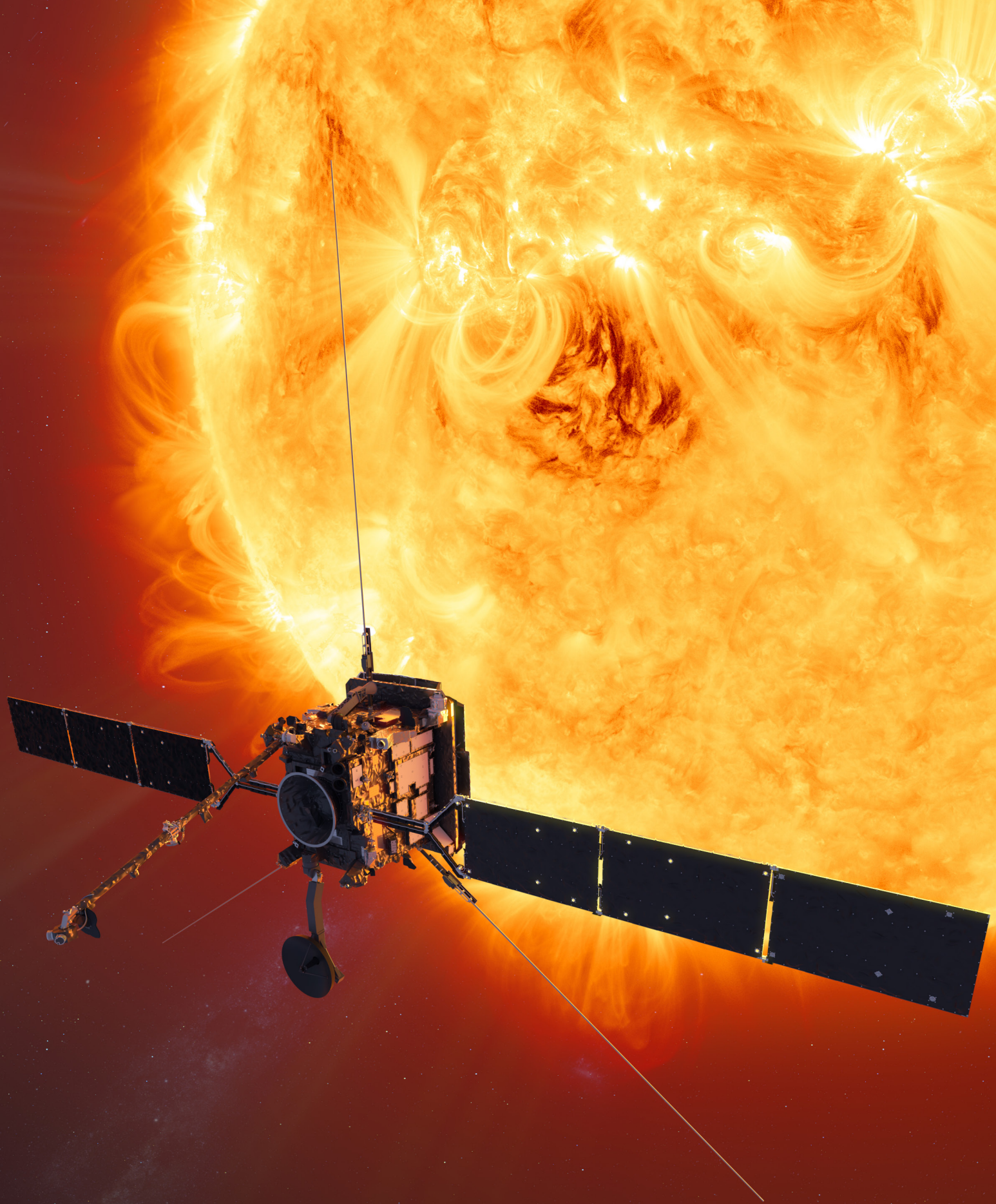
Our impact: Continuous attention on improving our management and delivery processes and ensuring that our staff have the capacity and skills to be effective, will enable us to be flexible and innovative while consistently meeting the needs of our customers and users, delivering to budget and to schedule.

Between 2023 and 2028 we will:

- Review our organisational design (including our funding model and governance systems) to ensure it is efficient, effective and enables us to fully unlock our potential and future needs
- Conduct periodic P3M3 self-assessments of our Portfolio, Programme and Project management processes, establishing action plans to ensure that all elements achieve Level 3, Defined Processes
- Establish a Continuous Improvement programme covering all parts of the department informed by the internal audits, staff suggestions and strategic reviews by management, all supported by staff trained in continuous improvement methods such as Six Sigma, Lean, Kaizen and statistical process control
- Improve project efficiency so that by 2028 we deliver a positive contribution of at least £2M/year back to STFC from externally funded work
- Extend EN 9100 and EC-Council Certified Security Specialist certificates to test facilities in R100 and the NSTF
- Build a capability to support external organisations in quality assurance
- Establish 5-10 year development plans for all facilities and infrastructure
- Conduct a systematic audit of department consumption and emissions, and establish action plans to start reducing those emissions as part of our sustainability plans
- Embed our Equality, Diversity and Inclusion (ED&I) commitments as Key Performance Indicators (KPIs)
- Build our relationships with UKRI services providers to improve the quality of service we receive

Acronyms

AI – Artificial Intelligence
AMOF – Atmospheric Measurement and Observation Facility
ACTRIS – Aerosol, Clouds and Trace Gases Research Infrastructure
CCS – Carbon Capture and Sequestration
CEDA – Centre for Environmental Data Analysis
CMIP – Coupled Model Intercomparison Project
CPD – Continuing Professional Development
ED&I – Equality, Diversity and Inclusion
EO – Earth Observation
ESA – European Space Agency
IPCC – Intergovernmental Panel on Climate Change
ISEM – Russian Infrared Spectrometer
JASMIN – Joint Analysis System Meeting Infrastructure Needs
JWST – James Webb Space Telescope
MIRI – Mid-Infrared Instrument
MMIC – Monolithic Microwave Integrated Circuit
NASA – National Aeronautics and Space Administration
NCAS – National Centre for Atmospheric Science
NCSSA – National Centre for Space Situational Awareness
NERC – Natural Environment Research Council
NSS – National Space Strategy
NSTF – National Satellite Test Facility
PUNCH – Polarimeter to Unify the Corona and Heliosphere
SKA – Square Kilometre Array
SRL – Societal Readiness Level
STEM – Science, technology, engineering, and mathematics
STFC – Science and Technology Facilities Council
SWIMMR – Space Weather Instrumentation, Measurement, Modelling and Risk
TRL – Technology Readiness Level
UKRI – UK Research and Innovation
UKSA – UK Space Agency



Solar Orbiter. Credit: ESA/ATG medialab



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For more information please contact:

RALSpaceEnquiries@stfc.ac.uk

STFC RAL Space
Rutherford Appleton Laboratory
Harwell Campus
Didcot
Oxfordshire
OX11 0QX

www.ralspace.stfc.ac.uk

